The National Transportation Safety Board and Mass Fatality Response

NTSB Mission

- Determining the probable cause(s) of transportation accidents
- Making recommendations to prevent their reoccurrence
- Conducting special studies and investigations
- Coordinating resources to assist victims and their families after an accident

NTSB Independence

- NTSB reports directly to Congress
- NTSB has no regulatory authority
- NTSB is composed of five Board Members nominated for five-year terms by the President of the United States and confirmed by the Senate

NTSB Responsible for Investigating:

- All U.S. aviation accidents (except those of military and intelligence agencies)
- Highway accidents (including certain grade-crossing accidents) which involve issues of wide-ranging safety significance
- Railroad accidents in which there is a fatality, substantial property damage, or which involve a passenger train
- Pipeline accidents in which there is a fatality, significant environmental or property damage
- Major marine accidents and accidents involving a public and a non-public vessel or accidents involving Coast Guard functions
- Transportation accidents involving the release of hazardous materials, including fatal accidents or those causing major disruptions to a community

NTSB Family Assistance Responsibilities

- Office of Transportation Disaster Assistance: coordinates and provides additional resources to the airline and local government to help victims and their families while preserving local responsibility and jurisdiction
- Aviation Disaster Family Assistance Act of 1996
- Foreign Air Carrier Family Support Act of 1997

NTSB TDA Areas of Primary Concern

- Initial notification
- Recovery and identification of remains
- Return of personal effects
- Information sharing

NTSB TDA Family Assistance Tasks

- Family Assistance Center
- JFSOC
- Family Briefings
- Victim Identification
- Site Visit
- Personal Effects
- Long-term information sharing
- 800 number, email, website

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- VST 1: NTSB Tasks
- VST 2: Airline Tasks
- VST 3: Family Care and Mental Health (American Red Cross)
- VST 4: Victim Identification, Forensic and Medical Services (NDMS/DMORT)
- VST 5: Assisting Families of Foreign Victims (Department of State
- VST 6: Communications (DHS/FEMA)
- VST 7: Assisting Victims of Crime (FBI Office for Victim Assistance)

NTSB Go-Team

- Full Go-Team
  - Dispatched to major accidents – all modes.
  - Particularly those involving a major operator, and/or having substantial damage, multiple injuries or deaths.
- Partial Go-Team
  - Dispatched to accidents or incidents (all modes) that involve safety issues or circumstances that warrant investigation such as:
    - High accident potential
    - Significant public interest

Arrival On-Scene

- NTSB coordinates with local law enforcement authorities
- Establish NTSB investigative resources at the accident site
- Establish an NTSB Operations Center
- Coordinate with Law Enforcement Command Post
- Confirm security arrangements
- Coordinate biohazard precautions with local authorities

Family and Press Briefings

- Factual information is provided to the families by the Board Member, the IIC or the Transportation Disaster Assistance staff representative prior to the media briefing
- The NTSB Board Member or IIC are the sole spokespersons for the investigation
- Factual information is reported

NTSB and FBI: A Working Partnership

- NTSB and FBI work together as partners on major transportation disasters
- New MOU signed fall 2005
- Expect to see the FBI at all major disasters
- NTSB is the lead agency until it is determined to be a criminal/terrorist act
- Assistance that might be requested from the FBI:
  - –Evidence Response Team (ERT)
  - –Disaster Squad
  - –Office for Victim Assistance
  - –Criminal Investigative Division
  - –Counterterrorism Division
- If an event is determined to be criminal/terrorist act, then specific handoff procedures will be employed. NTSB will support FBI as needed
- NTSB & FBI specialists and special agents are receiving cross training in specialized areas
- NTSB working very closely with FBI Airport Agents Program

Family Member Questions

- Where is my husband, wife, son, daughter?
- What happened?
- How will they be identified?
- How will I be notified if remains are recovered/identified?

- Why is taking so long?
- What is the condition of the body? Will an autopsy be performed?
- Can I go to the disaster site?
- What about the personal effects?
    - 800 Number
    - Central Gathering Place
    - Introductory Information
    - Immediate Physiological Needs
- Day 2-4
    - Routine Briefing Schedule
    - Site Visit
    - Identification Process
    - Media Attention St Day 4-8
    - Memorial Service
    - Return of Remains
    - Media Attention Lessens
    - Families Return Home

Fatality Management and Victim Identification

Victim Identification

- Medical Examiner/Coroner legally responsible for victim identification and determining cause/manner of death
- Legal issues: wills, insurance, remarriage
- Humanitarian/religious reasons: grief process
- Local and federal response: NTSB coordinates use of federal resources to assist the local jurisdiction
- Important to keep the families informed of the process of search, recovery, and identification

To conduct disaster victim identification, forensic scientists use four methods for positive identification, all based on comparison of unique biological characteristics from antemortem (AM) data to similar characteristics observed on the remains.

1) DNA: direct or family reference samples
2) Dental comparison: dental records obtained from victim's dentist
3) Fingerprints/footprints: AM records obtained from law enforcement or government source
4) Medical documentation (x-rays, implants, etc) or highly unique characteristics (e.g. tattoos, scars, birthmarks, moles, etc.)

Positive identifications are scientifically verified using accurate AM and PM documentation.

Fatality Management Considerations

- Number of fatalities
- Search/recovery challenges
- Decedent population: open or closed
- Condition of remains
- Antemortem data: types, availability, accuracy
- Identification focus: victims or remains
- Role of DNA: ID and/or reassociationConcerns/expectations of society and Next of Kin/Family members

Morgue Site Selection

Morgue Requirements

- Hot/cold running water
- Restrooms
- Electricity
- HVAC
- Drainage
- Parking
- Communications
- Secure
- 5000-8000 sq ft

Morgue Locations

- Hangar
- Abandoned warehouse
- National Guard armory
- ME/Coroner office

Do Not Use:

- Schools

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- Public Facility
- Hospital

Antemortem Interview

- Trained personnel
- Standard 8 page form (DMORT VIP)
- In-person and phone interview
- ID biological information
- Personal effects information
- Dentist and doctor contacts
- Next of Kin contact information
- DNA buccal swab collection

Death Certification

- Varies by state
- Issued by or through medical examiner/coroner
- For disaster victims:
    - Pending/Presumptive/Fatal Notice
        - Remains identified but further tests required
        - Remains can be returned to family
        - Identification completed
    - Allows next of kin to move along with insurance, etc.

Notification and Release

- Appropriate NOK notified of positive ID
- NOK has choice:
    - Release without further reassocation
    - Hold remains for future reassociation
- Once decision is known, remains are released or held/released accordingly
- Reassociation must await DNA results

Common Tissue

- Remains that cannot be identified
- Families informed
- Families can decide as a group what to do with common tissue
    - Interred at crash site
- If small amount, medical examiner/coroner can use existing mechanism for destruction of tissue

Family Assistance Issues

- Information on victim identification process
- Family briefings: coroner/medical examiner role
- Family site visits
- Board hearings and anniversaries

Fatality Management Issues

Three main issues impact the processing of remains and identification of decedents:

1) Number and type of decedent population involved the event
2) Availability and type of antemortem information
3) Condition of the remains.

These factors drive the personnel needed, how long identification will take, and the methods used to make identifications.

***Number and Type of Decedent Population*:** In general, there are two type of decedent groups. In a "closed population," the number of victims and their names are known. The singular example of a closed population is an aircraft accident, where the positive identification checks, ticket purchasing procedures, and airport security allow forensic responders to trust the accuracy of the flight manifest and its associated passenger name record. Passenger names and contact information are provided to the authorities within a matter of hours following an accident, and the collection of antemortem information can begin within the same time period.

Conversely, an "open population" is one in which neither the number of victims or their names are known. As such, response personnel must sort those who are *reported* missing (by friends and relatives) from those who are *actually* missing. This sorting process takes time. Once a decedent is known to be missing, then the process of obtaining and examining antemortem data can begin. In an open population, since the number and names of dead are not known, all remains must be profiled for DNA so that entirety of the decedent profiles is available.

Managing events involving open and closed populations forces forensic teams to weigh the need for forensic specialties. For example, in an event where remains are complete and the decedents from a defined geographical area, postmortem dental evidence will be easily obtained and antemortem dental records may be obtained quickly. As such, most identifications will be completed using dental means, calling for more forensic dentists and fewer forensic anthropologists and less DNA analysis.

***Antemortem Information*:** Identification requires comparing postmortem information and antemortem data. Collecting the postmortem information is relatively simple and rapid, as the remains themselves are analyzed when they become available from the scene. However, locating and obtaining accurate and current antemortem data is more time consuming and complex. Dental and medical records can be obtained rapidly if families know how to contact the dentist and doctor of the decedent. However, factors such as the age, socioeconomic status, cultural practices, and religious beliefs of the decedent and the family impact antemortem record availability. Experience shows that timely acquisition of accurate antemortem records is the most important factor in rapidly completing the identification process.

For example, foreign passengers of a low socioeconomic status may not have dental work, and subsequently no dental records. Many people have never been fingerprinted, or were printed through a process that may not have allowed the prints to be stored and retrieved. Some religions believe that is not important to have remains bury, and as such family members may be unwilling to provide DNA samples for identification. The proximity of the accident to the location of the decedent antemortem records impacts access to antemortem records. For example, if the a majority decedents are from the city where the accident occurs, then access to records will be more rapid because of the proximity of both families and dentists/doctors. Conversely, the antemortem record availability in an accident where no decedent is local (including foreign passengers), the access to families, and thus antemortem records, is comparatively more lengthy and complicated.

Missing Persons Call Center/Registry

In open populations disasters (where there is no immediately available list of the names of the deceased), family members who believe their loved one is missing will seek information on the victim's status and should report them missing to the appropriate state/federal

agency. A single disaster missing persons call center or registry capable of being rapidly activated following a major event is critical. A single system reduces confusion created by multiple databases maintained by private sector, non-governmental, and governmental agencies.

The designated missing persons call center receives all missing persons calls and develops a comprehensive list of those persons reported as missing. From this list, investigators (usually members of law enforcement missing persons divisions) establish a list of those actually missing through consolidating duplicate reportings, clarifying misspellings, and verifying the status of missing persons. Once a victim is known to be missing the process of obtaining and examining antemortem data begins. Information technology tools are essential in developing and managing the "true list" of victims.

Types of AM data: AM data are used for positive identification and death certificate information. AM data are obtained from the next of kin, family, and friends of the victim and the doctor, dentist; other health providers, and health insurers of the victim. Contact with the victim's next of kin (NOK) allows for the collection of contact information for dentists, doctors, employers, insurers, and others who may hold such data. NOK are also a source for DNA. NOK are interviewed to obtain death certificate information and other pertinent information on the victim. AM data consists of three types

1. Records: e.g. dental charts, radiographs, medical records, fingerprint cards, and photographs. Record useful for identification must detail the presence of the unique biological characteristics of the victim. Records should be obtained directly from the dental, medical, or government office. HIPAA laws do not preclude obtaining records for victim identification. DMORT, NTSB, and the American Dental Association have a standardized AM records release form that can be sent to a dentist or doctor detailing these requirements.
2. Family interview information: Using a standardized, disaster-specific form, trained interviewers ask NOK for information to complete the death certificate (varies by state), contact information for the victim's dentist/doctor, and answers to questions that may help identification. Answers about biological and medical topics provided by NOK should be considered as entirely accurate and should not used for positive identification.
3. DNA reference samples: Reference samples can be direct (those items containing DNA of the deceased) or family (DNA from family members related biologically to the victim). The DNA lab chosen to analyze the AM and PM samples must be involved in the collection process for chain of custody reasons. The biological relationship of the victim to those providing samples must be documented.

AM Record Location and Collection

AM records consist of medical records, dental records, fingerprint records, photographs, and other information documenting unique biological characteristics of the deceased. Since these types of records contain the most accurate and verifiable sources of information, they must be obtained through means that detail their source. NOK are often the first source of contact information for dentists and doctors. Fingerprint records may be available from the FBI and state law enforcement agencies. For example, military service, federal employment, and a criminal record of the deceased may indicate the presence of fingerprint records on file. The FBI Disaster Squad has expertise in locating fingerprint records.

Dental, medical, and fingerprint records should be obtained directly from the dental, medical, or government office maintaining them. Original records should be provided. Forensic specialists should make the requests directly from the dentist, doctor, or government agency. Families should provide only the contact information and should be dissuaded from obtaining the records themselves.

AM Interviews of NOK

In nearly all disasters, the best route to obtain AM information is through family members of the victim. This is usually done through an interview, wherein a trained interviewer will collect information from family members. Information collected during the interviews consists of:

- Legal NOK contact information (for death certificate and any contact with medical examiner/coroner)
- Contact information for dentist/doctor/employer of the victim
- Death certificate requirements (state-specific)
- Biological information about the victim (e.g., scars, tattoos, hair color, height, weight).
- DNA reference samples (direct or family)

  Chapter 8 of the Department of Justice publication "DNA Identification in Mass Fatality Incidents" details the procedures that should be used for DNA reference sample collection and documentation (http://massfatality.dna.gov/Chapter8/CollectingSamples/).

***Condition of Remains*:** Whole bodies are easier to process than fragmented remains. With adequate antemortem information, whole bodies can be identified quickly. Complete bodies contain the unique physical identifiers needed to identify the "person". When the body is identified, the decedent is identified. Fragmented remains present more complex issues. Certain body parts may contain these unique identifiers (e.g. dental work or fingers) and these parts can be identified. Identification of a fragment indicates both proof of death and identification of the decedent. However, after the initial identification, the remainder of the fragments representing the decedent must be identified. DNA analysis is used to identify body parts that have no unique physical identifier. However, DNA analysis does have limitations—not all DNA analyses result in a DNA profile.

In a closed population, high-fragmentation accident, forensic investigators work to identify all the victims, with an understanding that not all remains will be identified because of technological limitations of DNA. In an open population, high-fragmentation event, the focus is to identify all remains because the number and names of decedents are unknown. Unidentifiable remains are referred to as "common tissue." Common tissue must be managed carefully, and families must be informed of its existence and be involved with its final disposition.

Mass Fatality Internet Resources

Mass Fatality Incidents: A Guide for Human Identification
http://www.ojp.usdoj.gov/nij/pubs-sum/199758.htm.
Produced by the National Center for Forensic Science with the assistance of a group of experienced mass fatality forensic responders, this guide aids the medical examiner or coroner in preparing disaster plans with a focus on victim identification. First responders and others can use the guide to understand the death investigation process.

Lessons Learned from 9/11: DNA Identification in Mass Fatality Incidents
http://massfatality.dna.gov/
"Lessons Learned from 9/11: DNA Identification in Mass Fatality Incidents offers guidance on the myriad issues the forensic community must face in a mass disaster to ensure that all victims can be accounted for, and identified."

DMORT: Flight 93 Morgue Protocol
http://www.dmort.org/DNPages/DMORTDownloads.htm
The morgue protocol from the DMORT response to the crash of United Flight 93 on September 11, 2001. The criminal nature of this event caused DMORT to alter some of its morgue operations, and this protocol was adopted for this response.

Capstone Document: Mass Fatality Management for Incidents Involving Weapons of Mass Destruction
http://www.ecbc.army.mil/hld/dl/MFM_Capstone_August_2005.pdf
Guidance for medical examiners, coroner, and emergency managers for responding to a mass fatality situation following a WMD terrorist incident, mainly focusing on chemically and biologically contaminated remains. Includes information on developing incident-specific plans for managing catastrophic events. Prepared by the U.S. Army Research Development and Engineering Command Military Improved Response Program and DOJ Office of Justice Programs, Office for Domestic Preparedness (August 2005).

Identifying Victims Using DNA: A Guide for Families
http://www.ncjrs.org/pdffiles1/nij/209493.pdf
A 13 page guide written for family members to answer questions concerning the DNA identification process, the collection of reference samples, and other issues surrounding DNA identification of human remains.

Providing Relief to Families After a Mass Fatality: Roles of the Medical Examiner's Office and the Family Assistance Center
http://www.ojp.usdoj.gov/ovc/publications/bulletins/prfmf_11_2001/welcome.html
Providing Relief to Families After a Mass Fatality: Roles of the Medical Examiner's Office and the Family Assistance Center (November 2002) is an excellent resource for a variety of mass fatality family assistance and victim identification concerns. Areas addressed include:

- Primary issues and concerns of the victims' families
- Examples of a State/Federal partnerships for victim assistance services in a Medical Examiner's office
- Lessons learned about what is helpful when working with victims' families
- Family Assistance Center operations and resources, including a summary of procedural considerations.
- Formulating a Crisis Response Plan, including long-term crisis response plans

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Federal Family Assistance Plan For Aviation Disasters
http://www.ntsb.gov/publictn/2000/spc0001.htm (PDF and HTML)
Describes responsibilities for airlines and Federal agencies in response to aviation accidents involving a significant number of passenger fatalities and/or injuries. It is the basic document for organizations that have been given responsibilities under this plan (e.g. American Red Cross, DMORT, airlines) to develop supporting plans and establish procedures (August 1, 2000).

Guidance on Dealing with Fatalities in Emergencies
http://www.ukresilience.info/publications/fatalities.pdf
Well-researched and informative document on the broad issues of mass fatality management and family assistance.

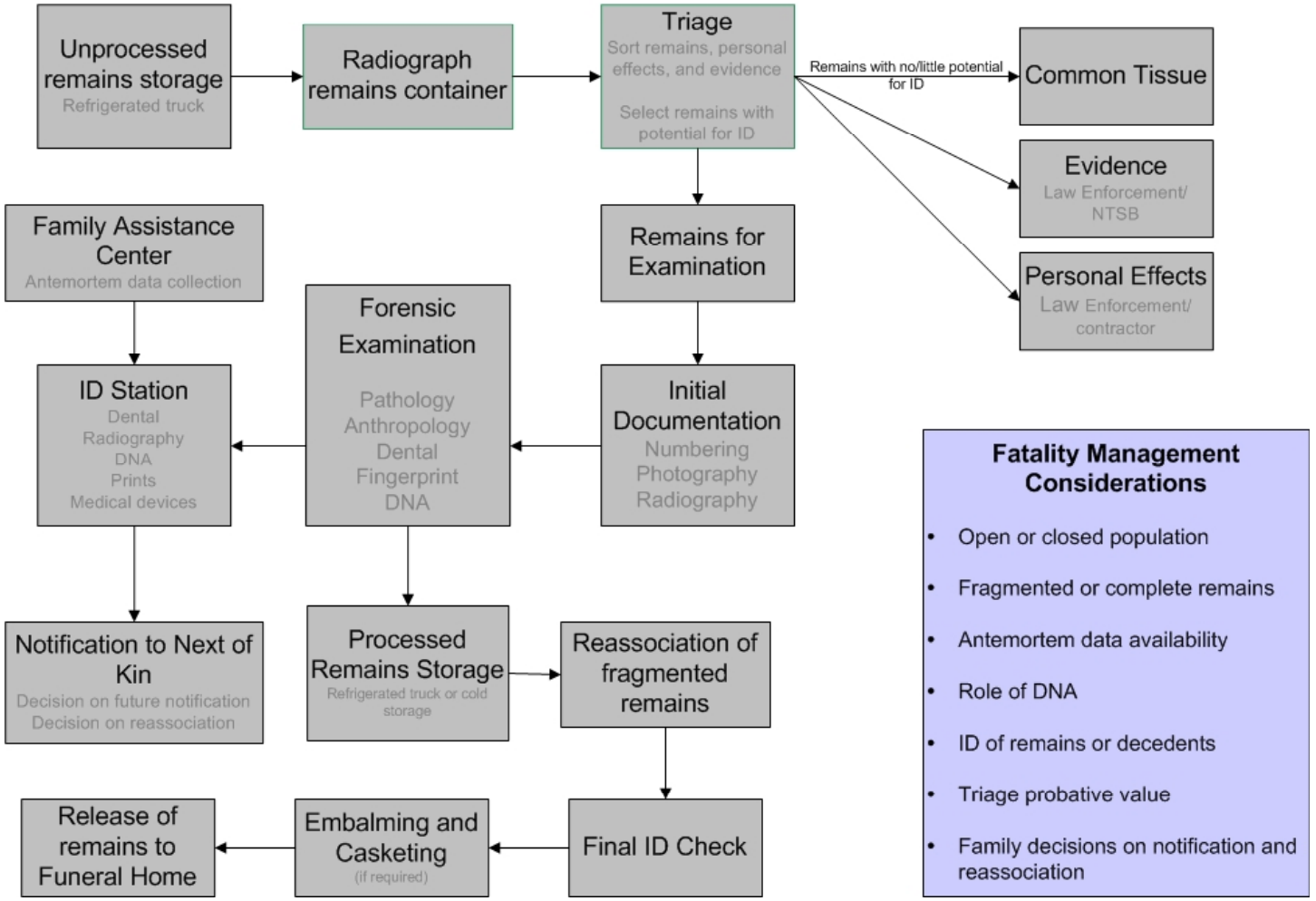
INTERPOL Disaster Victim Identification Guide
http://www.interpol.int/Public/DisasterVictim/guide/default.asp
A resource for general information on disaster victim identification primarily used in Europe and Middle East. Designed to encourage the compatibility of procedures across international boundaries, this guide gives practical advice on major issues of victim identification, underlining the importance of pre-planning and training.

Management of Dead Bodies After Disasters: A Field Manual for First Responders
http://www.icrc.org/Web/Eng/siteeng0.nsf/htmlall/p0880/$File/ICRC_002_0880.PDF!Open
This manual presents simple recommendations for non-specialists to manage the recovery, basic identification, storage and disposal of dead bodies following disasters, in addition to suggesting ways to provide support to family members and communicate with the public and the media. The principles outlined in this document are being implemented and promoted by a variety of organizations, including the Pan American Health Organization, the World Health Organization, the International Committee of the Red Cross and the International Federation of Red Cross and Red Crescent Societies.

Management of Dead Bodies in Disaster Situations
http://www.crid.or.cr/digitalizacion/pdf/eng/doc15631/doc15631.pdf
Comprehensive guide to a variety of mass fatality issues, including preparedness for mass death response, medicolegal work, health considerations in mass fatalities, sociocultural issues, psychological aspects, legal concepts, and several case studies from recent South and Central American disasters.

Improving procedures and minimizing distress issues in the identification of victims following disasters
http://www.ag.gov.au/agd/EMA/rwpattach.nsf/viewasattachmentpersonal/(85FE07930A2BB4482E194CD03685A8EB)~Improving_procedures_and_minimising_distress_issues_in_the_identification_of_victims.pdf/$file/Improving_procedures_and_minimising_distress_issues_in_the_identification_of_victims.pdf
"Reflecting on previous and current practices and experiences, this article draws on the procedures followed in the UK when establishing the identity of victims following disasters and highlights the differing needs, interests and issues arising for both professionals and the bereaved.".

Mass Fatality Morgue Operational Plan



Fatality Management Considerations

- Open or closed population
- Fragmented or complete remains
- Antemortem data availability
- Role of DNA
- ID of remains or decedents
- Triage probative value
- Family decisions on notification and reassociation

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Recent Accident Victim Identification and DNA Data

	Victims	*Remains*	*Convent. IDs*	*DNA IDs*	*ID Time*	*DNA Samples Victim/Reference*	*DNA Cost*	*Comments*
USAir 427 (1994)	132	1771	132	0	2 month	2/1	$3000	
Valujet 592 (1996)	110	4282	69	1	2.5 months	NA	NA	
TWA 800 (1996)	230	1000	214	16	1 year	240/16	$60,000	
Comair 3272 (1997)	29	NA	29	0	1 week	NA	NA	
Korean Air 801 (1997)	228	300 bags	94	72	6 months	234/23	$145,000	Cost figures for US-analyzed DNA only
Swissair 111 (1998)	229	2500	140	218	--	Unknown	Unknown	
Egyptair 990 (1999)	217	6000	19	144	6 months	1653/385	$856,000	54 families did not provide DNA reference samples
Alaska Air 261 (2000)	88	950	61	85	4 months	730/174	$255,500	3 not recovered
Executive Air (2000)	19	25	19	0	5 days	NA	NA	
American 77 and Pentagon (2001)	188	2000	108	183	3 months	938/372	$659,000	5 not identified 5 unique DNA profiles (terrorists)
United 93 (2001)	44	1300	10	44	3 months	592/164	$334,000	4 unique DNA profiles (terrorists)
American 587 (2001)	265	2077	219	234	1 month*	Unknown	Unknown	
USAirways 5481 (2002)	21	43	19	2	1 week	25/18	$12,500	
Corporate Airlines 5966 (2004)	13	30	9	4	2 weeks	25/16	$41,000*	New per specimen cost figures

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